



DEPARTMENT OF FISH AND GAME

## Division of Ecological Restoration

Tim Purinton, *Director*



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February 29, 2012

Orlando Pacheco, Town Administrator  
Lancaster Town Hall  
695 Main Street, Suite 1  
Lancaster, MA 01523

### Re: Comments on Cost Estimates for Bartlett Pond Dam Removal

Dear Mr. Pacheco:

On February 13, 2012, I attended the Select Board public hearing to discuss the potential removal or repair of the Bartlett Pond Dam (Nat. ID MA01561). The meeting included comment and discussion concerning the relative costs of dam removal versus dam repair. The Select Board elected to continue the hearing to March in order to obtain additional details concerning the dam removal cost estimate. I prepared this letter to share Division of Ecological Restoration (DER) experience with dam removal costs on planned and completed projects and to comment on the cost estimates to remove Bartlett Pond Dam. My comments focus on:

1. The Conceptual Dam Removal Opinion of Probable Cost (OPC) by PARE Corporation (herein 'PARE') dated June 2011 and prepared for the Town of Lancaster (NOTE – this was the cost estimate discussed at the above-reference public hearing);
2. The revised Conceptual Dam Removal OPC from PARE dated October 2011 and prepared for the Town of Lancaster; and,
3. The Site Reconnaissance, Preliminary Evaluation, and OPC by Stantec Consulting Services ('Stantec') dated June 2011 and prepared for DER.

In summary, based upon DER experience with other similarly sized dam removals in Massachusetts, and my review of the PARE and Stantec OPCs, ***I expect that a total cost on the order of \$450,000 to \$500,000 is reasonable for this dam removal project.*** Costs for recently completed or on-going projects of similar size and scope are provided as background information below, followed by specific comments on the three above-referenced PARE and Stantec cost estimates.

### Background

Several recently completed or on-going DER dam removal projects are useful for comparison purposes. All of these are medium-sized structures like the Bartlett Pond dam and similar in terms of project complexity (e.g. infrastructure and sediment management issues). A summary of costs (incurred or estimated) for these projects is provided below in Table 1:

Department of Fish and Game, Division of Ecological Restoration

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**Table 1 – Dam Removal Project Cost Comparisons**

<b>Project</b>	<b>Engineering Costs</b>	<b>Permitting Costs</b>	<b>Implementation Costs</b>
Bartlett Rod Shop Co. Dam Removal, Pelham	43,500 <sup>1</sup>	14,500 <sup>1</sup>	\$258,000 <sup>2</sup>
Wapping Road Dam Removal, Kingston	\$132,500 <sup>1</sup> (much of permitting done by partners)		\$189,500 <sup>1</sup>
Cotley River Dam Removal, Taunton	\$100,000 <sup>1</sup>	\$23,000 <sup>1</sup>	\$120,000 <sup>2</sup>
Ballou Dam Removal, Becket	92,000 (combined) <sup>1</sup>		\$325,000 <sup>1</sup>
Sawmill Pond Dam Removal, Plymouth	90,000 <sup>1</sup>	45,000 <sup>3</sup>	\$389,000 <sup>1</sup>

*1 = Actual Costs / 2 = Estimated Costs*

*3 = Included permitting costs for a large cranberry bog restoration as well*

Engineering costs for similar sized project has generally ranged between \$43,000 and \$130,000, and permitting costs have generally ranged between \$15,000 and \$40,000. The range of costs for permitting, in particular, reflects the relative contribution of DER staff and/or other project partners. Construction costs for similar sized dams have generally ranged from \$120,000 to almost \$400,000.

### **Specific Comments on Bartlett Pond Dam Removal Cost Estimates**

Comment #1 – The June 2011 OPC from PARE (\$786,000) is high. I suggest that the Town use the more recent (October 2011) estimate for decision-making.

Dam removals can be accomplished in a variety of manners depending on site conditions, constraints, and desired outcomes. Based on experience with other dam removal projects, I expect that several steps in the engineering, permitting, and construction process could be carried out at a lower cost than this estimate. Permitting, for example, usually costs \$15,000 – \$40,000, not \$70,000 as listed. Other large costs – such as \$136,500 for stream channel creation, bank stabilization (\$71,500) and planting (\$133,200) – speak to an engineering approach in which sediment is mechanically removed for the impoundment, the site is stabilized with riprap, and extensively planted. An alternate approach that involves impoundment drawdown and natural channel formation over many months would, for example, involve no ‘stream channel creation’ costs. Riprap would be minimal and the area could re-vegetate naturally, significantly reducing the stabilization and planting costs. The October 2011 PARE OPC is more in line with DER experience and costs for dam removals, and the rest of my comments focus on that estimate.

Comment #2 – The October 2011 OPC from PARE (\$507,000) is reasonable and likely conservative. I suggest that the Town use this estimate for decision-making.

Based on past experience, this estimate better reflects site conditions and construction approaches. Engineering and design costs in this estimate are higher than DER has seen on other, similar projects. An approximate average cost for engineering and design is between \$50,000 and \$100,000 including all field data collection. I understand that PARE has already collected much of the information needed for engineering and design, including wetland delineation, topographic survey, base map development, hydraulic and hydrologic (H&H) modeling, and sediment sampling and laboratory analysis. As such, it appears that proceeding directly to engineering plan development is reasonable. A feasibility study is not necessary, and eliminating that task would reduce the cost by \$35,000. Permitting costs of \$50,000 are higher than recent similar projects managed by DER. Note that Town of Lancaster staff could complete – or significantly contribute to – much of the permitting in-house to also reduce this cost. We see potential savings in several other areas based upon slightly modified approaches (for example, less planting, less

bank stabilization, potentially no dredging), but think this estimate leaves rooms for the unexpected and represents a good figure to use for planning purposes.

Comment #3 – The Stantec Report OPC (\$439,000) is reasonable (but not detailed) and supports the use of the PARE October 2011 OPC.

Based upon DER's experience, the conceptual cost for actual dam removal included in this OPC (\$250,000) is reasonable, and corresponds well to the more detailed PARE OPC (October 2011) for actual dam removal of \$274,000. A fundraising target of \$250,000 to \$300,000 for implementation is recommended. In terms of Stantec's 'coordination and design costs' note that approximately \$40,000 of this work has already been completed; thus total projected costs could be lower.

### **Conclusions**

In summary, a total project cost estimate of \$450,000 to \$500,000 is reasonable to DER based upon our experience with other similar dam removals in Massachusetts. It is important to note that certain factors may increase or decrease these costs substantially. For example, should Lancaster elect to enlarge the Frommer Conservation Area in association with the dam removal, construct boardwalks, and upgrade the adjacent parking area, then this expanded project would clearly cost more. Alternatively, early impoundment dewatering that allows the sediment to dry in advance of dam removal could lower construction costs. A streamlined approach to dam removal design and permitting could also lower costs.

Please feel free to contact me with question, comments, or concerns about this correspondence. Please note that I am not a registered professional engineer and these comments are offered based on DER's experience (including my own work on almost 20 dam removal projects) and should not be used in place of an engineer's OPC. I am willing attend the next Select Board meeting at your request to present this opinion and answer questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Alex H. Hackman".

Alex Hackman, Restoration Specialist

Cc: Peter Farmer, Lancaster Conservation Commission